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SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE •



January 22, 1938

It Does Strike Again

See Page 61

A SCIENCE SERVICE PUBLICATION

Do You Know?

The Soviet Union has an ice-breaker fleet of 26 ships.

Not all barberries make trouble by spreading the stem rust disease to grain fields—there are 30 barberry varieties considered "safe."

The world's most hunted fish is the herring—the most important food fish to man, and probably the fish with the most natural enemies.

Finding Roman ruins in Britain definitely named by inscriptions is rare, but a slab found recently names the village of Petuaria in Yorkshire.

Moscow has a Gold Museum, in which geologists have displayed gold nuggets, samples of alluvial gold and gold-bearing rock and other exhibits.

Tomatoes can be kept at ordinary temperatures almost twice as long if an oil and wax mixture is placed over the stem scar, because that is where the tomato chiefly "breathes."

Grass can now be given green medicine: a government scientist has found a green dye that controls grass diseases and at the same time keeps the sickly grass a pleasing green color.

Tuberculosis is increasing at a disturbing rate among medical students and student nurses in some parts of the world, showing that these students need greater precautions against acquiring this infection from patients.

SCIENCE NEWS LETTER

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QUESTIONS DISCUSSED IN THIS ISSUE

Most articles which appear in SCIENCE NEWS LETTER are based on communications to Science Service, or on papers before meetings. Where published sources are used they are referred to in the article.

AVIATION

Is the United States ahead of other nations in aeronautic research? page 51.

Why may gasoline engines be banned from airplanes of the future? page 55.

CHEMISTRY

Can sun and sodawater produce a breakfast food? page 53.

ECONOMICS—SOCIOLOGY

How many people in the United States are practically without income? page 60.

ENTOMOLOGY

Are insects protected by their coloring? page 57.

What are scientists using as a modern substitute for amber? page 51.

Why are scientists seeking a killer in the New Guinea jungle? page 52.

GEOGRAPHY

How large is the ice floe on which the polar scientists are camped? page 54.

When did school children learn that California was an island? page 53.

INVENTION

Is it possible to have a typewriter ribbon inked on only one side? page 54.

MEDICINE

How does the infantile paralysis virus enter the body? page 51.

Is cancer curable now? page 57.

What is the great value of heparin? page 56.

METEOROLOGY

Are we likely to have disastrous floods this year? page 56.

OCEANOGRAPHY

How old is the ocean? page 53.

PHYSICS

Can man see an object only one hundred times the size of an atom? page 55.

How many kinds of atoms have been produced by modern transmutation? page 56.

Is it possible to see two moons at one time while sober? page 62.

PLANT PHYSIOLOGY

How can plant breeders produce giants at will? page 58.

PSYCHOLOGY

Could sex offenders be cured by sterilization? page 57.

What is called the greatest group of mass murderers in the United States? page 61.

PUBLIC HEALTH

Do people die of overwork during a period of unemployment? page 56.

Vermont has its dust-bowl problem, the result of removal of trees and overgrazing of pastures.

Ancient China got its treasured jade from Chinese Turkestan and also probably from western Kansu.

When Alexandria, Egypt, was the center of learning of the ancient world, as many as 14,000 students gathered there at one time.

The most common defect in the eyesight of American school children is farsightedness; astigmatism, second.

The serious Dutch elm disease that is attacking American elms can be spread from tree to tree by interlacing roots.

The discovery that steel and iron can be rolled while cold, as well as while hot, was made by an accident and keen observation, about 80 years ago.

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AVIATION

Poor Military Aircraft Must Be Avoided Through Research

National Advisory Committee for Aeronautics Lists Questions on Which Experts Advise Concentration

IT WOULD be as disappointing and disastrous for the United States to produce inferior military aircraft "as it is to try to win on the second best hand in a poker game," the National Advisory Committee for Aeronautics warned in its annual report transmitted by President Roosevelt to Congress.

"Without up-to-date, reliable results of scientific laboratory research, our Army and Navy would not be able, even with the most sincere cooperation of the industry, to design and produce aircraft with any assurance that they would not be 'second best' in time of war," the report continued.

But the Committee, which is the government's aeronautical research organization, expresses its belief that its laboratories, located at Langley Field, Va., are as yet unexcelled by those of any other single nation, despite the recent great expenditures on research organizations abroad.

The N.A.C.A. attempts to look in the future and anticipate some of the problems that may rise. Some of these are:

What are the maximum requirements for military and commercial aircraft going to be?

Will speeds in excess of 400 miles per hour be required?

How much will the size of commercial aircraft exceed 50 tons within the next few years?

What are the problems that will require scientific analysis before such craft can be successfully designed and constructed?

What of Airships?

Will airships be further developed for naval use or for transoceanic transportation and, if so, what are fundamental problems the N.A.C.A. should investigate?

Aeronautical research problems pressing for immediate solution, as listed by the N.A.C.A., are: The need for devising a method for studying the stalling characteristics of highly tapered wings; the determination of the necessary load factors and their variation with size and

speed; the problem of reducing or eliminating if possible the formation of ice on wings, propellers, and control surfaces, and of providing effectively for the automatic removal of ice when it does form; problems involved in the design of wings, control surfaces, and flaps, as well as other devices to secure better control at low speeds incident to taking off and landing; problems of suppressing vibration and flutter, improving engine and propeller efficiency, capacity, and dependability, extending the range, enlarging the capacity, and at the same time constantly increasing the speed and safety of aircraft.

Science News Letter, January 22, 1938

ENTOMOLOGY

Transparent Plastic Used To Preserve Insects

PRECIOUS amber, prized by mankind as a gem and by the scientist for the remains of long-extinct insects preserved in it, has a modern rival in a new technique for preserving insects in transparent plastic materials.

Details of a process for putting insects inside a preserving shell of synthetic resin are independently reported by Dr. J. H. Hibben of the Geophysical Laboratory, Carnegie Institution of Washington, and Dr. Charles E. Sando of the U. S. Department of Agriculture.

Insects can be preserved intact inside the resin shell in much the same manner as insects that died thousands of years ago are today preserved in million-year-old amber, the fossilized resin of trees long extinct.

Using compounds with jaw-breaking names such as methyl methacrylate, the two scientists have succeeded in protecting the insects from the ravages of daily moisture changes which damaged unmounted specimens.

Theoretically simple—merely causing resin to form around the insect—the process entails a fair amount of painstaking work, requiring considerable patience and much skill. The specimen to be mounted must first be dried, without



MODERN "AMBER"

A long-horned beetle "under glass." The beetle is preserved inside a block of transparent plastic material. A special technique is required to mount specimens by this new method.

changing the colors or shape, then immersed in the compound and kept under heat and pressure until new compounds, called polymers, are formed in the original preservative.

Drs. Hibben and Sando have succeeded in mounting insects, dry plant materials and a host of inorganic substances in plastic blocks. Using other methods, G. R. Fessenden, of the Department of Agriculture, has worked out means for "fixing" the colors and shapes of growing plants, so that they too may be mounted in plastic shells. Leaves and flowers, just as they come from the field, can be mounted to protect them from damage and preserved in a "fresh" state indefinitely.

Science News Letter, January 22, 1938

MEDICINE

Research on Polio Takes New Angle; Virus Strains Differ

A NEW lead on the fight against infantile paralysis appears in research reported by Drs. James D. Trask and John R. Paul of Yale University School of Medicine to the journal, *Science*, (Jan. 14.)

Efforts to prevent the disease by nasal sprays of chemicals to block the nerve of smell have been based on the generally accepted belief that the virus which causes infantile paralysis enters the body through the nasal endings of the nerve of smell. The Yale investigators now have evidence which casts some doubt on all of this.

Some strains of infantile paralysis virus will cause the disease in a large per-

centage of monkeys when simply injected under the skin, Drs. Trask and Paul found. These virus strains were recently isolated, some of them coming from patients in the Toronto epidemic last summer. Older virus strains, obtained long ago and kept growing in laboratories for years, rarely produce the disease unless injected into the nasal cavity.

The difference between the strains may be only a coincidence, the Yale investigators point out. If it is not coincidence, it is obvious, although the scientists say nothing of this, that the fight against the childhood plague will have to be approached from a somewhat different angle.

Sulfanilamide No Help

Sulfanilamide, the new chemical remedy that has apparently been conquering one infectious malady after another,

is probably not going to be any help against virus infections like infantile paralysis. Research indicating this is reported by Drs. Earl B. McKinley, Ellen Gray Acree and Jean Sinclair Meck, of George Washington University School of Medicine to the same journal.

These investigators tried sulfanilamide as a remedy for infantile paralysis in monkeys and for two other virus-caused diseases in rabbits, but the new chemical failed to save the lives of these animals. All but one monkey died.

The explanation, Dr. McKinley suggests, is that sulfanilamide is unable to exert its action against a disease germ when the latter gets inside body cells, as viruses do. In the diseases for which sulfanilamide has proved an effective remedy the causative germs are bacteria of a type which live between body cells rather than inside them.

Science News Letter, January 22, 1938



FOR SUGAR

Insects, both destructive and beneficial, are gathered from the tropics of all the world, in efforts to place sugar cane growing on a more scientific basis. Here, Dr. F. X. Williams, Hawaiian entomologist, examines a collection from Guatemala.

Hunt in New Guinea for Foe Of Sugar Cane Insect Pest

When Killer Ally Is Found Then Long Difficult Feat Of Transplanting Him to Foreign Soil Will Begin

DEEP in the wilds of New Guinea lurks a killer insect without a name. A party from Hawaii is slashing its way through the jungle, risking death from disease and possibly unfriendly natives, determined to "get their bug."

Not that they intend to drag their six-legged quarry back to the bar of civilized justice. Quite the contrary; they approve the creature's lethal activities, for it is one of the insects that unconsciously fights man's battles by killing other insects that are harmful to his crops.

This particular insect is an enemy of the sugar cane borer, one of the most destructive pests both in Hawaii and in the sugar area of the mainland United States. It is hoped that it can be transplanted and acclimated first in Hawaii, and then possibly also the rest of the way across the Pacific.

The new insect ally of sugar cane planters was discovered quite by accident. A scientific exploring party was sent out by the Hawaiian Sugar Planters' Association, under the leadership of Cyril E. Pemberton, to seek new types of wild

cane. Their boat was wrecked on the New Guinea coast.

Thrown onto a forbidding and possibly hostile shore, the party occupied itself with forays into the jungles while they waited for help. They discovered a patch of cane, close to a swamp. Some of the stalks were afflicted with borers. They opened these up—and found the long-sought enemy of the pest.

Marking the place of discovery, and trusting the insect's descendants would still be there when they returned, Mr. Pemberton and his party journeyed on to Honolulu. Elaborate preparations are being made for the insect's importation. With acclimatizing stations established possibly in Samoa, Fiji and New Caledonia, the attempt will be made to transplant it to Hawaii.

Life spans of such insect allies, and the tremendous distances over which they must frequently be brought, make it impossible to carry individual insects through. The originals are generally established near their homeland, where they can be watched and their food requirements studied. Insects on which they feed must be similarly treated. In

some cases a whole coterie of enemies of various types must be captured, studied and carefully reared to get a single one through, and a failure in preserving any one type may destroy the chances for the entire expedition.

Similarity of climates must also be taken into consideration. Too great a change in one step may spell disaster. It is nothing unusual for a year or more to be spent in carrying a single desired insect over a few thousand miles.

Successfully transplanted, there is still the very definite danger that in the insect's new homeland his life characteristics may suddenly change. An originally valuable species, after acclimatization, may lose its interest in hereditary enemies and be utterly valueless as an ally to science. Even more serious, it may suddenly be imbued with the inclination to cooperate with established pests, and itself become a menace that forces instant eradication.

New insects, life forms, plant species, etc., must therefore be placed in isolation wards where they can be watched under Territorial conditions. Imprisoned in limited areas, insects and plants are placed with them, and more months allowed to pass while constant check is kept of developing tendencies. Only after positive proof of benefit are the doors opened and the new ally installed in the field.

Science News Letter, January 22, 1938

OCEANOGRAPHY

Oceans Half Billion Years Old, Their Salt Tells Scientists

Finding That Clay Acts to Remove Salt Content Of Water Leads To Revision of Antiquity Estimates

THE EARTH'S salty oceans are some 500,000,000 to 700,000,000 years old, almost double the accepted previous estimates, Drs. A. C. Spencer and K. J. Murata, of the U. S. Geological Survey, have concluded after an intensive study of oceanic chemistry.

Before the turn of the century, geologists determined the age of the oceans by dividing the amount of salt in them by the amount added each year. This was based on the idea that all the salt brought to the oceans by rivers stayed there. Such an early determination of age, after hundreds of surveys and analyses, was about 100,000,000 years. Later research brought the age to 350,000,000 years. But such figures were found to be too small. Dinosaurs are now known to have existed about 100,000,000 years ago and oceans obviously existed long before that.

Studying the action of clay on salt water, Drs. Spencer and Murata in the recent work have found that some of the salt carried to the oceans is removed by clays, and deposited on the sea floors as a compound that does not easily dissolve. Correcting the old figures for this salt removal give them the new age figure of 500,000,000 to 700,000,000 years.

The geologists who measure the earth's age by the products of the decay of radioactive elements are expected to say the new ocean age estimates are too small. They pronounce the earth at least 2,000,000,000 (two billion) years old. While the earth in its earlier stages may have been oceanless, there is in the radioactive age figures plenty of room for even more ancient oceans.

Science News Letter, January 22, 1938

CHEMISTRY

Synthesizing Carbohydrates Will Not Cause Revolution

REVOLUTION in agriculture will not come immediately as a result of the artificial preparation of carbohydrates by Prof. E. C. C. Baly of Liverpool University. Such seems to be the consensus of opinion among U. S. Department of Agriculture scientists interviewed by Science Service.

The nub of the matter is the very great expenditure of light-energy necessary, when water and carbon dioxide are brought together in the presence of the nickel oxide catalyst used by Prof. Baly. Plants are admittedly inefficient in their energy use, but in its present stage of development the artificial synthesis of food out of its raw materials is even less efficient when carried out in glass flasks.

It is more or less like the atomic energy situation. Fabulous sums of energy are locked up in atoms, and assertions are freely made that if this could be

liberated one could run all the machinery in the world on a few quarts of water a day. The only trouble is that in practical experiments it takes more energy to break the atoms apart than they yield by their decomposition.

So we probably won't be able to put out our nickel-oxide-lined dish full of soda-water in the morning and let the sun make our porridge for us. There will still be a market for oats raised in the old-fashioned way.

The real value in Prof. Baly's work, and what he was aiming at in the first place, is a better understanding of how plants themselves carry on photosynthesis. It has long been a disputed point, for example, whether they first made sugar and then turn it into starch, or whether starch comes first and is broken down into sugar. In the results presented at Calcutta there is a hint that

the progress is from the more complex starch to the less complex sugar.

Nevertheless, it would be rash to deny the possibility of eventual practical application. When Benjamin Franklin performed his classic kite experiment, he was interested only in finding out, as "pure" science, what lightning was made of. It was not until a hundred years or more later that even the crudest beginnings of the Age of Electricity could be recognized. Perhaps there will be sunshine-and-sodawater porridge in 2038.

Science News Letter, January 22, 1938

GEOGRAPHY

Northwest Coast Once Worried Map-Makers

SCHOOL children today scarcely realize what a past the American map has had. Maps of America are invariably the same shape—two triangles linked by the same thin isthmus, and with the same bays, lakes, cities, in the same expected places.

It was very different in earlier days. A young scholar in Colonial New England might be taught that California was an island by one teacher, and later might encounter another teacher who put faith in a different map, equally insistent that California was not an island. The entire northwest coast was one big uncertainty, with map-makers violently disagreeing over its shape and features.

Tracing the evolution of that part of the North American map is no easy task. Henry R. Wagner, who has studied the history and cartography of the northwest coast almost 15 years, has finally put the results into two volumes, each the size of a geography schoolbook. (*THE CARTOGRAPHY OF THE NORTHWEST COAST OF AMERICA TO THE YEAR 1800—Henry R. Wagner—Univ. of California Press, II Vols., 543 p., illus., \$20.*)

Our northwest coast was for a long time, he explains, the most remote part of the inhabited world that a European could think of. True, a few colonists lived there in rude plenty. But in general, "no one wanted to go there and no one did."

The world was gold mad, and there was no gold near the sea. The coast had to wait for civilization to develop its riches.

Mr. Wagner describes nearly a thousand maps, atlases, and globes that confidently set forth the features of that distant region, up to 1800.

"Not only," he says, "did it form

part of every map of the world; it was also put on every map of Mexico and North America, and besides, after a good part of it was believed to be an island, many maps were made simply to show this feature."

Historians have rather neglected the

northwest, so far as its map story is concerned. It has had far less attention than the northeast, but as Mr. Wagner rightly protests, it is "quite as interesting."

Science News Letter, January 22, 1938

GEOGRAPHY

Ice Floe Rotation Prevents Magnetic Variation Measures

Scientists Follow a Lifeline in Blinding Snow From Camp to Tent at Which Their Soundings Are Made

ROTATION of the ice floe on which four Russian scientists are drifting in the Arctic has forced Jenya Fedorov, expedition magnetologist, to give up measurements of magnetic variations, Tass, Soviet news agency, has learned by radio from the ice floe camp.

"But it does not affect the other observations," I. Papanin, chief of the group, radioed. "In general our specialists, Shirshov and Fedorov, have to work under very difficult conditions."

Reporting on 200 days of scientific work since they were landed on an ice floe near the North Pole on May 21, Papanin radioed:

"We have thoroughly studied the path of the ice floe from the North Pole to the coast of Greenland. We measured the depth of the ocean at 15 points and made hydrological soundings at 26 points, having taken samples of water at each point from 15 to 25 various depths.

"We made several series of observations for the study of the direction and the speed of the submarine currents. Our hydrological work finally established the existence of a sufficiently abundant organic life in the central part of the Arctic Ocean.

"During our stay on the ice floe we have made more than 100 astronomical observations. These will make it possible to trace precisely the entire path of the drift and to learn the laws governing the movement of the ice floes in the Central Polar Basin.

"In general, our program of scientific observations has been extensive. We hope that 35 definitions of magnetic elements, 13 observations on gravitation, several series of observations of the electric condition of the atmosphere will not prove useless.

"We are aware that our regular meteorological observations are received

with great interest by scientific institutions on the mainland. We note weather changes every two hours and send the results four times a day to the south.

"We watch the Polar Ocean attentively. We have gathered substantial scientific material and many scientists will now obtain reliable data on the entire area of our drift from the North Pole to the final point."

Describing the taking of soundings, Papanin reports that the expedition members use a rope to connect the small sounding tent to their camp so as not to lose time looking for it in the Polar night. "Along this rope we travel safely in any weather. Without this it would be rather difficult to find one's bearings in a snowstorm. Once Krenkel and I lost our way and while being within a few steps of our tent, we could not find it for quite a long time."

The floe on which the four Soviet scientists have been living for more than seven months is large enough for a small town, P. Shirshov, another member of the group, radioed.

"Our ice floe, shaped like a huge triangle, stretches for nearly four kilometers," he reveals. "There is enough space on it for a small town with all its boulevards, squares and parks. We have smooth ice fields here suitable for the landing of a whole squadron of heavy airplanes, there are picturesque little hillocks up to three meters high. In places strips of scarcely frozen water gleam darkly.

"Our hydrological tent has been pitched on a small field of new ice. Under our conditions a hydrological sounding means thirty hours of work with three brief intervals for rest right here on the ice. When you wind a windlass for twenty-four hours, hoisting up hundreds and hundreds of meters of seemingly

endless line, a fur shirt, even at a temperature of thirty degrees below zero, becomes an altogether superfluous item of one's costume."

Soundings have revealed shallower water as the floe approached Greenland, Shirshov adds. On November 8 a great submarine elevation projecting a whole kilometer (a little more than 3,000 feet) above the surrounding sections of ocean bottom was found. At least the previous and succeeding soundings were a kilometer greater than the depth found on that day.

The party's ice floe is turning in a clockwise direction as a result of the approach to the Greenland coast, a subsequent radio message declares.

"The ice current, flowing from the Polar basin into the Atlantic Ocean, strikes on its flank the rocky promontories of land. Therefore the right edges of the ice fields drag. The retardation is transmitted from one ice floe to the other, and as a result each one separately rotates clockwise."

Science News Letter, January 22, 1938

INVENTION

Typewriter Ribbon Inked On Only One Side Invented

AMERICAN inventors have been thinking out new gadgets and devices to add to the pleasure of existence, a survey of the 744 patents issued in one week by the U. S. Patent Office showed.

To prevent the clogging of typewriter keys and other printing media that print through a ribbon, and to enable an operator who handles things like addressing machine plates to avoid soiling his hands, George W. Schaefer of Quincy, Mass., has invented a typewriter ribbon that is coated on one side only. The type presses on the clean side of the ribbon, pressing the ink on the other side onto the paper, Mr. Schaefer explains in the specifications accompanying Patent No. 2,103,275.

Manuel Somohano of Mexico City has devised a non-blurrable mirror for the bathroom. Patent No. 2,103,384 has been granted him for his mirror, which uses electric heating units to prevent moisture from condensing on the mirror, and also is equipped with electric lights.

A fountain pen cleaner featuring a rubber bulb into which the pen point is inserted has been designed by Joseph D. Sheehan of Brooklyn, N. Y. Squeezing the bulb and releasing it exerts suction on the pen and thus cleans it out.

Science News Letter, January 22, 1938



POWERFUL

Surpassing all theoretical magnification limits, this microscope, designed by Drs. L. C. Graton and E. C. Dane, Jr., of Harvard University, make possible pictures of objects only 100 times as large as an atom. Motor-driven adjustments combine extreme fineness of control with speedy operation. The instrument weighs about a ton.

AVIATION

Gasoline-Fueled Motors May Be Banned From Airplanes

Diesel Engines Are Already Operating With Lower Fuel Consumption and Less Weight per Horsepower

"THE public will some day be no more required to fly in gasoline-fueled airplanes than in hydrogen-filled airships," government aviation scientists predicted at the meeting of the Society of Automotive Engineers in Detroit.

Ernest G. Whitney and Hampton H. Foster of the Langley Field laboratories of the National Advisory Committee for Aeronautics based this forecast of aviation's future on their study of Diesel engines for airplanes as a potential replacement for present gasoline-fueled motors. The almost negligible ability of Diesel fuels to burn except under the special high pressure and temperature conditions within a Diesel engine is the reason for their startling statement.

The use of super-gasolines of 100 octane, anti-knock rating will bring an improvement in gasoline-fueled airplanes, state the N.A.C.A. experts, but the Die-

sel engines used in German airplanes today are accomplishing what enthusiastic engineers are only predicting for gasoline motors five years hence.

"Well qualified authorities," they state, "predict for the 100 octane gasoline engine in the next five years specific fuel consumptions no better than 0.38 pound of fuel per brake horsepower hour and specific engine weights in a 2,000 horsepower unit no less than one pound per horsepower, whereas, the Junkers Jumo engines are operating today at specific fuel consumptions as low as 0.36; and a 2,000 horsepower engine development is in progress to weigh less than one pound per horsepower."

Forgetting about the technical terms used, the scientists are saying that five years from now gasoline fuel engine advocates predict a certain fuel consumption (0.38) with engines weighing 2,000

pounds that can create 2,000 horsepower. And they add that present-day Diesel engines are already operating with a lower fuel consumption (0.36) and that there is now being built a Diesel engine generating 2,000 horsepower which will weigh less than 2,000 pounds.

Science News Letter, January 22, 1938

PHYSICS

Powerful Microscope Makes Very Tiny Objects Visible

NEW inroads into the world of the small are envisioned now as a result of the construction at Harvard University of a microscope more than four times as powerful as any microscope ever built before.

Designed by two Harvard geologists, Drs. E. C. Dane, Jr., and L. C. Graton, Harvard's new instrument can magnify up to 50,000 diameters, enough to enlarge the period at the end of this sentence to the size of a two-story house. Its effective magnification—the limit at which no new details are shown—is 6,000 diameters, more than four times the previous limit.

So powerful is it in comparison to its smaller contemporaries that it far surpasses what was believed by scientists a year ago to be the theoretical limit of the usefulness of a microscope.

Much of this magnification is "empty," resembling that of a large photographic print produced from a miniature negative. Effective magnification, producing more visible detail as it increases, up to 6,000 diameters, is secured with this instrument.

Weighing about a ton, this microscope is mounted on the steel bed of a lathe, to secure stability. So fine are the focusing screws that it would take 25 minutes of rapidly turning them by hand to produce a motion of 1/400 of an inch. Motors, with several speeds, do the turning more quickly.

Used chiefly for examining ores, this microscope catches images too small to be detected by ordinary instruments. Objects only 100 times as large as an atom can be seen and photographed.

With the theoretical limits already passed, there seems to be no reason why even greater magnifications, with lenses designed according to revised theories, cannot be made. Already, another of these microscopes, patterned after the original model, but slightly improved, has been installed by the Canadian Department of Mines, in Ottawa, to be used in the minute study of ores.

Science News Letter, January 22, 1938

MEDICINE

Hope of Preventing Fatal Blood Clots Renewed

RENEWED hope of preventing fatal blood clots after surgical operations appears in the report of Drs. D. W. G. Murray and C. H. Best of the University of Toronto Faculty of Medicine (*Journal American Medical Association*, Jan. 7). Dr. Best is co-discoverer of insulin for diabetes.

Heparin, an anti-bloodclotting substance from the liver, has been prepared in such pure form that it can be safely given to humans without danger of poisoning, the Toronto investigators report. It prevents the development of blood clots (thrombosis) in the veins of dogs. In their report the Toronto investigators state that this purified heparin has now been given to 220 patients after operation at the university hospital and also to a group of patients in Sweden.

Many times this number of patients must be studied, Drs. Murray and Best point out, before any conclusions as to the effectiveness of heparin in preventing thrombosis can be reached. Heparin and its anti-bloodclotting property were first discovered by Dr. William H. Howell of Johns Hopkins University.

Science News Letter, January 22, 1938

PUBLIC HEALTH

Millions Unemployed But Overwork Kills Thousands

MILLIONS of Americans are unemployed while "many useful citizens die prematurely from overwork." This tragic state of affairs was recently commented on by Dr. O. F. Hedley of the U. S. Public Health Service. Dr. Hedley is investigating the problem of heart disease, one form of which is responsible for the premature deaths from overwork that Dr. Hedley comments on.

A great many deaths from heart disease, 40 out of every 100, occur in persons past 70 years old. These cannot be classed as premature, and Dr. Hedley points out that as a result of saving lives in earlier decades by controlling diseases such as typhoid fever and diphtheria, more deaths from heart disease at older levels are inevitable.

At present, however, more than half the heart disease deaths occur before the individuals have lived out their normal life spans. Rheumatic heart disease, for example, causes at least 40,000 deaths every year and the average age at which

these victims die is 30 years. In their case the tragedy is that they have never had a chance to work.

A large amount of heart disease, about 60 per cent, Dr. Hedley estimates, is the result of high blood pressure, hardening of the heart arteries and hardening of the arteries all over the body. Many of these victims die at an advanced age. The same condition occurs far too often, however, in middle life. The average age at death from coronary thrombosis is 60 years. This condition is a stoppage of the heart's arteries as a result of thickening and hardening of the walls. It seems more frequent among business and professional men than among wage earners, and the strain of ceaseless work and worry is often held responsible. Victims of this heart malady are, presumably, the ones Dr. Hedley sees dying of overwork in the midst of unemployment.

Science News Letter, January 22, 1938

METEOROLOGY

All Quiet, Is Report on Anniversary of Great Floods

JUST a year ago, the disastrous floods of the Ohio valley and elsewhere in the Midwest and the East were beginning to pour evil upon the land. In this anniversary week the situation is wholly different, with no flood menace in sight, Merrill Bernard, chief of the river and flood division, U. S. Weather Bureau, informed Science Service.

None of the major rivers of the country is at all high, Mr. Bernard stated, and the Ohio especially is low. The water level behind the great Norris Dam on the Tennessee, always a stream to watch carefully in late winter and early spring, has purposely been lowered to provide a wide margin of safety.

At present there is practically no snow cover on the principal flood-making watersheds, and the soil is not saturated. Indeed, west of the Mississippi, the lack of soil moisture reserves is causing considerable anxiety.

The only thing that could cause a serious flood situation would be a series of torrential rainstorms close upon each other's heels. Nothing in the present general weather map indicates the probability of such an event; though admittedly there is no way of forecasting probabilities of continued non-flood weather for more than a few days in advance.

To sum up: In general, all is quiet along the Potomac, and the Ohio, and streams west and south.

Science News Letter, January 22, 1938

IN SCIENCE

ARCHAEOLOGY

"Old Temple of Athena" Declared Not Temple at All

AFAMOUS landmark in Athens, called "the old temple of Athena," was actually used by the Greeks as a very different sort of public building, Dr. Leicester B. Holland of the Library of Congress has concluded.

Dr. Holland believes that this building, which stood on the Athenian Acropolis on the spot where early kings had their palace, continued to be a meeting place for civic officials. Instead of shifting from civic to religious use, he says, the site would naturally have kept its traditional function. There, in the place of the King's Hall, the civic council would continue to meet around the sacred hearth, and to entertain ambassadors and city guests.

Science News Letter, January 22, 1938

PHYSICS

Modern Atom Smashing Has Added 220 Kinds of Atoms

THE GOAL of ancient alchemists—the transmutation of the elements—has been achieved by the atom-smashers of the laboratory so well that there remain only two chemical elements which have not yet yielded to the art of the modern scientist, said Dr. K. K. Darrow of the Bell Telephone Laboratories.

Before the days of modern transmutation the world consisted of some 250 kinds of atoms, said Dr. Darrow. Of these about forty were unstable atoms—like radium—which spontaneously disintegrated into other forms.

"It looks now as though nature had already made almost all the stable forms of nucleus which are possible," declared Dr. Darrow. "While physicists, in a scant four years, have already made almost all the unstable forms which are capable of lasting as much as a few seconds."

Already to the 40 radioactive forms of atoms found in nature modern science has added no fewer than 220 others by the art of transmutation.

Science News Letter, January 22, 1938

SCIENCE FIELDS

MEDICINE

Cancer More Nearly Curable Than It Ever Was Before

CANCER is more nearly a curable disease than ever before, Dr. Shields Warren of the Harvard Medical School declared in a public lecture at the school.

Cases of the disease are being recognized earlier and treated more effectively, he said, and there is definite evidence that the cancer death rate can be checked. Many people, he emphasized, die needlessly of cancer because they delay in seeking treatment, either through ignorance or through fear.

Prompt treatment, he emphasized, is of vital importance in checking the disease for once it has spread treatment is difficult if not impossible. There are still but three satisfactory ways of treating cancer, he declared: surgery, radium and X-ray.

"But even if we had no further knowledge than that now available, but could apply it promptly," he emphasized, "the percentage of cures could be doubled." The new super-voltage X-rays of 400,000 to 1,000,000 volts, he added, may well extend medicine's ability to cure and control the disease.

Science News Letter, January 22, 1938

ETHNOLOGY

Fast Work Needed to Save Old Navajo Lore

SCIENCE must work fast to get information now stored in Navajo Indian minds.

This warning is sounded by Francis H. Elmore of the State Museum at Santa Fe, who has been querying these Indians on use of various plants.

The Navajo had ideas for using at least 500 plants growing in their Southwestern country. The great outdoors was a shopping center where a Navajo could go for basket materials, for food, drinks, medicines, and dyes.

But that's changed. With government aid, and with ways of earning money from blankets, silverware and sheep brought to Navajo attention, these Indians have taken much of their "trade" away from the old plant stores. Conser-

vatives still prefer some of the foods eaten by their forefathers. But Mr. Elmore explains that a Navajo has learned that he can buy food almost as cheaply as he can gather it, and with half the trouble.

Consequently, a young Navajo is little better at describing ancestral customs than a young New Englander might be at telling you how his great-great grandmother made soap. Some older Indians still have valuable information, but Mr. Elmore warns that "in a few years the Navajo will probably have forgotten how many of the plants were used."

Early Navajo lived chiefly on corn, as these Indians still do, he explains. But whenever war or roving interfered with farming, resourceful Indians could live on seed, roots, stems, and leaves, sustaining themselves even on long journeys. The daring of the traditional first-man-who-ate-an-oyster was matched by more than one Navajo who tasted some scrubby fruit to try its food value.

Study of Navajo ways may yield useful information, Mr. Elmore foresees. The pinon nut, Southwestern Indian fare, has become a commercial article for the white man's market, and other Navajo plants may prove useful.

Science News Letter, January 22, 1938

ENTOMOLOGY

"Protective" Coloration Really Does Protect

"PROTECTIVE" coloration of insects really does protect them against their bird enemies, despite recent claims to the contrary, declares Prof. F. B. Isely of Trinity University, Waco, Texas.

Prof. Isely reports experiments designed to test this point critically. (*Science*, Jan. 14). He laid out a plot of ground in 16 by 16 inch squares. These had the colors of different types of soil, and some of the squares were planted with green grass.

On all the squares Prof. Isely put grasshoppers and related insects, either anesthetized or fastened so that they could not wander off. Some of the insects matched their backgrounds, others contrasted with them. They were exposed to the attacks of mockingbirds, cardinals, sparrows, turkeys, and bantams.

Observations showed that 88 per cent. of the insects that contrasted with their backgrounds were found and eaten by the birds, whereas of the insects placed on backgrounds that harmonized with their own colors only 40 per cent. were eaten.

Science News Letter, January 22, 1938

PSYCHOLOGY

Sterilization Not Cure For Sex Offenders

STERILIZATION or castration of sex offenders would not prevent them from making sex attacks and might actually add to their sex deviations and homicidal mania, Dr. Lowell S. Selling, director of the psychopathic clinic of the Recorder's Court, Detroit, declares.

Glandular operations on sex offenders have been urged by many lay groups in Detroit and elsewhere. Dr. Selling has found from medical examination and study of 150 sex offense cases going through his clinic between May and December that such an operation would be useless and also dangerous to society. He reported his preliminary findings to the recent sessions of the American Association for the Advancement of Science. Further study of some 5,000 cases is now being made by Dr. Selling.

Sex offenders are not characteristically over-sexed. Underfunctioning of the sex glands was found to be actually more important in contributing to sex offenses than is an oversexed condition. The man who attacks little children is sometimes a person who is undersexed and hence incapable of normal marriage. The trouble is more likely to be psychological than glandular, Dr. Selling indicated. Many of the men studied had some peculiarity of appearance so as to be, or to think they were, repulsive to most girls. Any operation or treatment that would tend to increase this feeling of inferiority would aggravate their menace to society rather than eliminate it.

Mental deficiency and disease was found by Dr. Selling to be very important in contributing to sex crime. Half the group studied are feeble-minded or of inferior intelligence. Six are senile, three psychotic, and nine suffer from compulsive neurosis.

Alcoholism was found to be extremely important. Almost two-thirds of the group are alcoholic. Many have adopted alcohol as a substitute for adequate food which the men were without money to buy. Many of the crimes were committed under the influence of alcohol.

An unexpected finding was that the after effects of mumps may be an important contributor to sex crime. One-third of the cases had had mumps, although only about half that proportion was found in an equal number of non-sexual offenders.

Science News Letter, January 22, 1938

BOTANY

Plants Grow Whiskers

Hormones and Drugs Have Strange Effect on Growth, Rooting, Flowering, and Seed Production of Plants

By DR. FRANK THONE

A ROMANCE was once written by H. G. Wells about a "Food of the Gods," that caused enormous growth in record-breaking time in human beings and all kinds of animals. Even before that, of course, we had the classic fairy tale about Jack's beanstalk, that remarkable vegetable that climbed to the clouds in a single night.

Jack's beanstalk was a pure figment of the imagination. The story Wells wrote was based on the then new and sensational discoveries about hormones, or gland secretions, in animals. These are chemicals of amazing properties. Minute quantities of hormones make us tall or squatty, thin or fat, angry or affectionate, depending on what glands they come from and what parts of us they affect.

Now it is being rapidly discovered that plants have hormones, too—though no sharply marked-off glands for making them have yet been discovered in plants. Their effects are just as sensational as those of animal hormones, and their eventual practical applications may become as far-reaching.

Already one of these plant hormones is in widespread use among gardeners and nurserymen, to make roots form on cuttings of such valued woody plants as holly, yew, lemon, etc., which ordinarily are very stubborn about throwing out roots and must be propagated much more expensively by grafting, or grown from seed without certainty as to quantity or quality of the product.

Seedless Fruits

Another possible use, demonstrated thus far only in a scientist's greenhouse, is spraying hormones into unpollinated flowers of tomatoes and other plants, which then produce fruits completely without seeds. Commercial application of this very recent discovery will depend on finding ways of treating large numbers of flowers rapidly and cheaply.

Some of the experimental results are simply fantastic: making roots grow from leaves, and even from petals of flowers. One botanist, surveying a plant with a mass of artificially induced roots

growing among the leaves on its stem, said, "We can make plants with whiskers now!"

The single piece of research that made possible this production of roots wherever you want them was deemed worthy of a \$1000 prize at a recent meeting of the American Association for the Advancement of Science. The experimenters mixed a very small quantity of the hormone with lanolin, an animal fat, to make a kind of paste or salve. This they spread on the stems and other plant parts where they wanted roots to grow. And the roots grew.

On the Market

Anybody can do it now. Several chemical manufacturing concerns have the material on the market. It is offered under a variety of patented trade names, but its true chemical name is indole-3-acetic acid. Under that name its retail price is about \$3 a gram. That makes it rather expensive, for a gram is only approximately a thirtieth of an avoirdupois ounce. But a little of the hormone goes a long way: plants react to dilutions as thin as one part in several millions.

If there is a child in your neighborhood who mysteriously refuses to get

taller, the doctor may say something more or less unintelligible about glandular deficiency, administer a remedy made from the glands of slaughtered animals—a hormone. Whereupon, if all goes well, the youngster resumes normal growth.

Hormones are necessary for growth in length by plants no less than they are for growth by children. Indeed, of the relatively few plant hormones we know, the best known ones are those of plant growth. They are called the auxins, from the Greek word meaning growth.

Formed at Stem Tips

Auxins are formed at the very tips of growing stems and other actively growing parts of the plant. Their effects, however, are not in the same regions where they are formed, but a little back of or below them, where cells are elongating rapidly. The auxins are what cause the cells to elongate.

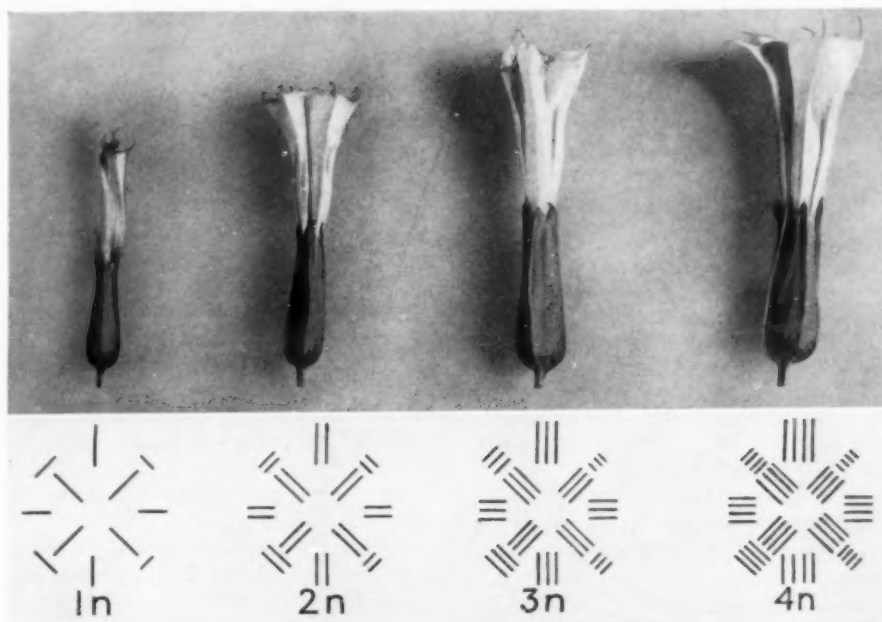
The picture is further complicated by the fact that the stem-tips apparently do not make auxins out of raw material on the spot, but receive some half-finished product, known provisionally as "auxin precursor" from below, turn it into the active hormones, and then send it back to the zone of elongating cells.

Thus, although plants do not have definite glands as animals do, these fast-growing tip-ends appear to serve in much the same way as glands.



QUICK EFFECTS

Chemical duplications of auxins have strange effects on plant growth within an hour after application. On the left is a normal tomato plant, untreated; in the center one treated with the gas ethylene; on the right one treated with indole propionic acid. Bending is toward the treated side when the application is large; away from it if small.



MORE CHROMOSOMES: BIGGER FLOWERS

Above, flower sizes in strains of *Datura*, arranged in order of the number of chromosomes, as shown in the diagrams below. These range from haploid (half-normal) on left, through diploid (normal) and triploid to tetraploid (twice normal). Changes in chromosome numbers were induced by application of colchicine solution. The photograph is used through the courtesy of the *Journal of Heredity*.

There are three kinds of auxins thus far known, called respectively auxin a, auxin b, and hetero-auxin. (That "hetero" comes from the Greek, too; it means merely "other.") Hetero-auxin is the one that has been identified as the chemical indole-3-acetic acid and is now sold to nurserymen and laboratory workers with plants.

Strangely enough, plant hormones are also made by animals, and animal hormones are formed by plants. Auxin is found in a number of familiar animal gland secretions such as saliva, pepsin, and urine. It is also found in glandular organs themselves, like the liver and the kidneys. It is abundant in incubating eggs during certain stages of the embryo's development.

Animal Hormones in Plants

Among the animal hormones formed by plants is one of the most powerful and most useful: theelin, the female sex hormone. Strangely enough, too, theelin and certain other animal hormones have strongly stimulating effects on plant growth, when strong doses of them are added to the soil in which the plants are growing. This, of course, is still too expensive a way to speed up crop growth; but some day something may come of it.

Some of the lower plants, particularly

fungi, are known to have auxins of their own. Yeast, which may be regarded as a special type of fungus, has an auxin-like stuff that has been named bios. Where bios comes from is still uncertain; it seems sure that the yeast does not make all the bios it needs for its own growth.

Whole Subject is New

The whole subject of plant hormones is still shiny-new. "Growth substances" were vaguely talked about for a couple of centuries, but it was not until well into the present one that plant hormones became definitely known things. As an index: a recent list of technical articles on the subject published in scientific magazines contained nearly 300 titles. Very few of them were more than twenty years old, and the vast majority were published less than five years ago.

A new world in plant knowledge and plant control is opening to us. It would be rash to prophesy what may happen. It would be even more rash to declare anything impossible.

Science sometimes accomplishes its revolutions with the oddest of weapons. Who for example would have thought that the sovereign remedy for the once-dreaded pernicious anemia would be found in liver, a "giblet" that butchers once could hardly give away? Or that

common garden peas would crack open the sealed secrets of heredity?

Science has once more wrought a wonder with an obscure and unpromising means. This time it is a somewhat old-fashioned remedy for rheumatism, gout, and similar ailments. The stuff is known as colchicine, and it is made from the bulbs of the common autumn-flowering crocus, named *Colchicum autumnale* by botanists.

If a solution of colchicine is injected into a plant, or merely sprayed on it, or applied in any of a half-dozen other ways, the leaves presently begin to act strangely. Patches of their tissue grow faster than neighboring parts, so that the leaves come to have a wrinkled, crumpled appearance.

Offspring Are Giants

Flowers that grow from some of the colchicine-washed places on the stem are apt to be freakish also. But what is more important, the seeds they bear are apt to produce giants—plants that look like their parents but are much bigger, and breed true to their new big size.

If the colchicine treatment is applied to this giant generation, the process may be repeated, bringing on a second and even larger race of giants. The plants have been doubled and redoubled.

At the Cold Spring Harbor station for experimental evolution of the Carnegie Institution of Washington, where this hitherto unsuspected power of colchicine was discovered, results have been obtained with such field and garden crops as clover, alfalfa, tobacco, onion, and radish, and flowers like cosmos, nasturtium, foxglove, and phlox.

The prospect of producing bigger (and inferentially better), true-breeding plant varieties is exciting enough, but that is only the beginning of the story.

What goes on inside the plant tissues when they begin to show such strange external behavior apparently is a doubling of the chromosome numbers. Chromosomes are the structures within the cell that carry the genes, or units of heredity.

It has been known for a long time that when chromosome numbers double by spontaneous or accidental action in cell division, the offspring are likely to be giants. But this is the first time that such doublings have been made possible whenever man wants them. Scientists therefore have a new springboard from which they can dive even deeper into the secrets of life.

One of the most thrilling possibilities opened up by this new way of making



"WITH WHISKERS"

The stem of this plant grew a perfect beard of short roots when the soil in the pot was treated with a hundredth of a gram of indole butyric acid, one of the synthetic growth-promoting substances.

chromosomes double up is the chance of getting hitherto impossible hybrids that will produce offspring. As a rule, one can get only sterile hybrids between two plants or animals that are not closely related, like horse and donkey, or cabbage and radish. This is because the chromosomes of the alien cells have a hard time finding proper mates when crossing takes place.

But if you can bring into the picture these giant germ cells with double or quadruple chromosome numbers, it is much more easily possible for these difficult crossings to be made. Once made, it is again more easily possible for them to continue true to seed.

This does not mean that completely unrelated plants can now be crossed. We are not going to see such fanciful hybrids as strawberry with watermelon or endive with cucumber. But scientific Cupids may try to arrange such cousin-matings as tomato with eggplant, or wheat with a wild grass, or lettuce with endive. Results are apt to be interesting, and some of them may be highly valuable.

The botanical building at the University of Chicago has its top floor built as a greenhouse, but no plants are ever grown there. When it was built it seemed a fine idea, but the plants just

acted queer and then died. So they had to give it up.

But members of the botany department were determined to find out what ailed the place. They traced the trouble very quickly to illuminating gas used in the laboratories on floors below. Then they took the gas to pieces chemically, to see what made it so poisonous.

They discovered that the poisonous part of the gas was a compound known as ethylene, found in almost all natural and artificial gas. A number of other compounds, some of them related closely to ethylene, others not, were found to have similar effects. Many of these worked also when they were dissolved in water reaching the plants.

But finding out that ethylene and other compounds were plant poisons did not close the case at all. The plant physiologists knew, from medical experience, that very small doses of poison can be useful as tonics or stimulants.

Continued experimentation showed that these poisonous gases could be put to work in much the same way. And now they do work, in hundreds and thousands of places, affecting large quantities of fruits, vegetables, flowers, and other marketable plant products.

Gas treatments have been found valuable, for example, in bringing the bright hue of ripeness to oranges and

other citrus fruits, which are green-skinned when they are picked. Bananas, also shipped green, are made beautiful for their market debut with a touch of the same magic gas. Celery is blanched. Dormant cuttings of many species of flowers are made to awaken, like Sleeping Beauty in the story, by the invisible stimulus.

It develops that ethylene is a normal product of the life-processes of plants themselves, particularly during the process we call ripening. This explains the "mysterious" power of apples in a cellar to prevent sprouts on potatoes stored in the same bin. The apples give off enough ethylene to discourage the sprouts. Experiments in Germany have even shown that apples will stunt the growth of seedlings, cause leaves to fall off sensitive plants, etc., all through the power of their internally-generated ethylene.

The late G. K. Chesterton once wrote a book of essays which he titled "Tremendous Trifles." He could have found plenty of material in the plant world to write about. Every day we are finding some new thing, trifling in size or quantity, but tremendous in its effects on the green life round about us, and therefore in the end on us also, who are dependent on plant life for the maintenance of our own lives.

Science News Letter, January 22, 1938

ECONOMICS—SOCIOLOGY

Millions of Americans Fail To Affect National Economy

ONE out of six people in the United States could disappear tomorrow without affecting the income of the nation, it was revealed before the American Association for the Advancement of Science in an inquiry that provides preliminary blue-prints for more effective use of human resources and manpower.

Some 15,000,000 to 20,000,000 people live at a subsistence level and take a very meager part in economic life, a paper communicated by Frederick Osborn of New York City declared.

These people, representing probably some of our finest stocks, are located in the Appalachian Highlands, the Ozarks, the cut-over regions of northern Michigan, Minnesota and Wisconsin and they include marginal farmers and sharecroppers in the South and the western

wheat areas. The unemployed in our cities are also in the class of our population that neither produce nor consume in the sense of any broad exchange of goods.

One of the major tasks of society is to make these people into effective producers and consumers.

"If all our people could be brought to the level of the 25 per cent. who are at present our largest consumers, our total economic activity could be increased manyfold," Mr. Osborn declared.

Scientists were called upon to assume social responsibility for the consequences of their inventiveness, lest they find themselves in the subservient position of German scientists. Dr. Eduard C. Lindeman of the New York School of Social Work warned that "a technological age cannot afford to have its

values set by persons unfamiliar with the foundations of science and technology.

"Science must become much more forthright in accepting its social responsibilities and especially the responsibility

for understanding basic human needs and for releasing the unused energies of men," said Dr. Lindeman. "Education must become more scientific, both with respect to its methods and purposes."

Science News Letter, January 22, 1938

PSYCHOLOGY

Youth at the Wheel Found Skilful But a Great Hazard

Drivers Between 16 and 20 Kill Twice as Many as Equal Number of Average Motorists; Recklessness Blamed

THE FLAMING younger generation stands condemned as the greatest group of mass murderers in America. The weapon is the automobile.

Although including more highly skilled automobile drivers than any other age-group, 100,000 drivers between 16 and 20 years of age kill nearly twice as many on the road as the average 100,000 drivers.

Accident rates for those below 25 years of age are so high that bringing down that age group's accident rate to the general level would save nearly 8,000 of the nearly 40,000 killed each year on the American highway and street.

These challenging figures were presented to the American Association for the Advancement of Science by Dr. Harry M. Johnson, research associate for the Highway Research Board, Washington. Young men between 19 and 21 years of age are apparently the worst menaces on the highway, Dr. Johnson declared, pointing to a chart which indicated plainly that young men just approaching their majority are responsible for many more accidents per 100,000 drivers than any other group.

Middle-aged men between 46 and 55 may be a bit slow as compared with

their younger traveling mates, but they are involved in relatively far fewer accidents, he continued.

Knowledge of their own skill and consequent willingness to take chances beyond their own capacity to meet were tentatively blamed by the speaker as the factor chiefly responsible for the great proportion of accidents among youthful drivers.

"Some skilful drivers, relying on their agility and alertness, may enter hazardous situations that are a little beyond their ability, whereas less skilful drivers, being aware of their weaknesses may stay out of them," he concluded.

Nearly 30,000 drivers registered for the six years from 1931 to 1936 inclusive in the state of Connecticut were the experimental raw material, study of which led Dr. Johnson to the conclusions he revealed. Fatal accident figures were compiled from a study of 2,165,241 drivers over a period of five years. His work is being carried out as a joint project of the Highway Research Board and the U. S. Bureau of Public Roads.

Nearly two-fifths of all accidents, Dr. Johnson pointed out, are caused by a small number, less than four per cent. of the drivers, indicating that a driver who has one accident is likely to have others. Accident-repeaters, as he termed them, are a serious highway menace who do much to increase death and destruction out of proportion to their numbers.

Science News Letter, January 22, 1938

Judging by recent tests, it is harder to see letters than numbers on automobile license plates.

Egg white foam, once a waste by-product of the egg-drying industry, can now be saved as dried egg white, by means of a new process.

PHOTOGRAPHY—PHYSICS

Lightning Strokes Caught By a Rotating Camera

See Front Cover

LIGHTNING does strike twice and more than twice in the same place, it is demonstrated by the photograph appearing on the front cover of this week's SCIENCE NEWS LETTER. Eleven separate strokes make up what appears to the eye as a single lightning flash.

The strokes, which come so fast that the human eye cannot distinguish them, were photographed by General Electric Co. scientists. The Empire State building in New York City is the target.

The flash as the human eye sees it (main flash in center) was caught by one camera lens, while another one, rapidly rotating, caught the eleven separate strokes. The first one is the streak at the right, the last one is at left. The flash took .36 seconds altogether.

Science News Letter, January 22, 1938

RADIO

January 27, 4:00 p. m., E.S.T.

WHAT'S NEW IN CHEMISTRY—Dr. Harrison E. Howe, editor of *Industrial and Engineering Chemistry*.

February 3, 4:00 p. m., E.S.T.

THE USEFUL SOYBEAN—Dr. Henry J. Knight, Chief of the U. S. Bureau of Chemistry and Soils.

In the Science Service series of radio discussions led by Wadson Davis, Director, over the Columbia Broadcasting System.

PAVLOV AND HIS SCHOOL

The Theory of Conditioned Reflexes

By Y. P. FROLOV

This fascinating and important book provides much biographical information concerning the great Russian founder of the School of Conditioned Reflexes, together with a clear and concise account of the theory of conditioned reflexes. There is also an account of Pavlov's predecessors and of the circumstances which led to the evolution of his method of investigating nervous activity. The author, who was one of Pavlov's own pupils, describes actual experiments and glimpses of the life of the workers in the laboratory. \$4.00.

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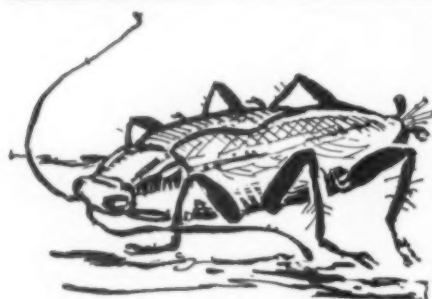
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Chancellors and Cockroaches

IF YOU don't like the Chancellor (no matter: *any* chancellor) maybe you call him a cockroach, or perhaps an old crab. Even if he does happen to hear you, he shouldn't feel insulted: chancellor, cockroach, and crab all had the same descent.

Not merely in the bio-evolutionary sense. The Chancellor will admit that, if he isn't too proud or too Fundamentalist. The three words, and many others besides, had the same philological origin, states Prof. A. L. Melander, New York University entomologist, in a new book. (SOURCE BOOK OF BIOLOGICAL TERMS—Axel Leonard Melander—College of the City of New York, 157 p., \$1.10.)

In addition to giving definitions and examples and tracing origins of all the more commonly used words, prefixes and suffixes that crop up in writings on the life sciences, Prof. Melander goes off on some very interesting excursions into the field of word-meanings and word-origins, proving himself competent as both entomologist and etymologist.

In his search into the philological origins of chancellors and cockroaches, Prof. Melander constructs an evolutionary tree in approved biological fashion. At the bottom is the Greek word SKAR, meaning a scratch. As he remarks, "Chancellor, Crayfish, and Cockroach started from scratch."

First derivative is the Greek word KARABOS, meaning either crab or beetle—both of them scratchy creatures. Easily recognizable is the Latin derivative *scarabaeus*, whence our own scarab. From the same line of descent, through Portuguese and Spanish, we get first the Spanish *cucaracha*, which modifies easily to cockroach.

KARABOS is nearly related to the ancient Teutonic word *chrebiz*, meaning a crab, whence modern German *Krebs*, French *crevice*, and English crab and crayfish.

A third main line of word-descent starts from the same ancient Greek crab-beetle word and passes over into the Latin word *cancer*. Somehow (possibly through its many, ranked legs) a crab suggested a grill or grating, *cancelli*, in the Latin. Behind such a grill an officer often sits: it becomes a *chancel*, and the officer a *chancellor*.

Not all words have such clearly traceable and legitimate descent. Mistaken derivations give us such things as *tuberosa*, which is neither a rose nor tubular in shape; the flower has the specific name *tuberosum* from its tuberous base. Similarly the plant known in French as *vermouth* and in German as *Wermut* became first Early English *wermod*, and then wormwood!

Science News Letter, January 22, 1938

Almost one-third of the land surface of Britain is hill land, at present producing little or nothing for the British people.

PHYSIOLOGY

Saliva From Vampire Bats Contains no Anti-Coagulant

SALIVA taken from the mouths of blood-feeding vampire bats, tradition to the contrary notwithstanding, contains no agent that prevents the blood from clotting, two Columbia scientists report. (*Zoologica*, Oct. 7.)

Four vampire bats, of the type that tradition says are blood suckers but fact says are not, at the New York Zoological Park were studied by Barry G. King and Robert Saphir. They checked the clotting time of blood taken from wounds the bats had made on experimental animals they were feeding on with blood obtained from the animals by laboratory methods. In addition, they measured the clotting time of blood mixed with specimens of the bat's saliva.

The blood drippings commonly seen in tropical regions where the vampires live can be traced to massaging of the wound by the bat, which uses its tongue for that purpose if the blood is not flowing freely enough.

The victims of the vampire bat do not seem to be particularly disturbed by the bats feeding on them, the two scientists also found. The wounds are only skin-deep.

Science News Letter, January 22, 1938

PHYSICS

Ship's Officer Saw Two Setting Moons

ORDINARILY, if a seafaring man in the tropics sees two moons he discreetly says nothing about the matter, lest a cynical world raise an eyebrow and murmur something about too many swizzles. But Third Officer R. T. Lewin of the American steamer Yorkmar saw a double image of the moon recently for which an abnormal refractive condition of the earth's atmosphere was responsible.

Mr. Lewin observed the strange phenomenon during a run from Balboa, C. Z., to San Pedro, Calif., while his ship was off the tip of Lower California. The crescent moon was going down through a thin haze, when it appeared double, the lower crescent scarcely touching the upper. Twenty minutes after he first noticed it, the moon set, still appearing double.

The observation, which was made on Dec. 6, has just been published in a bulletin of the Hydrographic Office of the U. S. Navy.

Science News Letter, January 22, 1938

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•First Glances at New Books

Additional Reviews
On Page 64

Health

THE TRAFFIC IN HEALTH—Charles Solomon—*Navarre*, 393 p., \$2.75. This is an unusually readable discussion of patent medicines and cosmetics, their dangers and extravagant costs. It is more than an exposé. The author, a physician and professor at Long Island College of Medicine, includes in his book interesting historical material, an explanation of disease and its treatment, and a concluding chapter on what to do and give before the doctor comes.

Science News Letter, January 22, 1938

Astronomy

THE OBSERVATIONAL APPROACH TO COSMOLOGY—Edwin Hubble—*Oxford Univ. Press*, 68 p., \$4. This book is ideal for the layman who wants to know more about astronomy. Field evidence, and the conclusions that may be drawn from it are presented with admirable clarity without technical terminology.

Science News Letter, January 22, 1938

Motion Pictures

WE MAKE THE MOVIES—Nancy Naumburg, ed.—*Norton*, 284 p., illus., \$3. A group of outstanding screen personalities join hands to take the reader through the production of a motion picture from the time the first ideas of the plot are conceived, until the completed prints are ready for distribution. Jesse L. Laskey, Bette Davis, Paul Muni and Walt Disney are among those who discuss specific problems along with many equally competent, but less well-known persons. "Behind the screens" shots increase the interest.

Science News Letter, January 22, 1938

Regional Planning

REGIONAL PLANNING, PART IV, BALTIMORE - WASHINGTON - ANNAPOLIS AREA—*Maryland State Planning Commission*, 65 p., illus., maps, 40 c. Intelligent looking into the future of the important area between three cities. The planners see adequate highways, forests preserved, suburbs in the form of multiple Greenbelt villages pleasant to live in.

Science News Letter, January 22, 1938

Physiology

THE MACHINERY OF THE BODY—Anton J. Carlson and Victor Johnson—*Univ. of Chicago*, 580 p., illus., \$4. In planning this book for both college students who may follow their elementary physiology course with further study of the subject and for the general read-

er, in or out of college, the authors have adopted the device of starring the headings of the less elementary sections of the text. At that, the unstarred sections seem pretty heavy going for the general reader, although the student will undoubtedly find the book valuable.

Science News Letter, January 22, 1938

Anthropology

THE NEGRO'S STRUGGLE FOR SURVIVAL. A STUDY IN HUMAN ECOLOGY—S. J. Holmes—*Univ. of California Press*, 296 p., \$3. This is an unbiased presentation of the Negro problem in the United States, from the biological viewpoint. Studies of birth and death rates, susceptibility to disease, migration and race mixture and other factors are reviewed and conclusions drawn therefrom.

Science News Letter, January 22, 1938

Philately

A DESCRIPTION OF UNITED STATES POSTAGE STAMPS—U. S. Post Office Department—*Govt. Print. Off.*, 119 p., illus., 25 c. paper, 75 c. cloth. Stamps issued from July 1, 1847 to December 31, 1936.

Science News Letter, January 22, 1938

Medicine

PRACTICAL BIRTH CONTROL: A GUIDE TO MEDICALLY APPROVED METHODS FOR THE MARRIED—Rita Irwin and Clementina Paolone—*McBride*, 172 p., \$1.75. This book gives detailed advice, simply told, on medically approved methods of birth control and warns equally plainly against unreliable or dangerous methods.

Science News Letter, January 22, 1938

Chemistry

ESSENTIALS OF COLLEGE CHEMISTRY—G. H. Whiteford and R. G. Coffin—*Mosby*, 514 p., \$4. A Colorado State College version of chemistry for beginning students. The book is planned "as a guide to a course of reasoning . . . rather than a presentation of specific chemical behavior of substances."

Science News Letter, January 22, 1938

Archaeology

ONCE UPON A TIME IN EGYPT: STORY AND PICTURES—Frances Kent Gere—*Longmans, Green*, 71 p., \$2. To introduce children to ancient Egypt, this book tells the everyday adventures of several boys and a girl of noble birth, in the pyramid age. The drawings, some in color, are skillfully done in the Egyptian style, simplified so that children may enjoy them.

Science News Letter, January 22, 1938

Biology

BIOLOGY, THE STORY OF LIVING THINGS—George W. Hunter, Herbert E. Walter and George W. Hunter, III—*American Book Co.*, 670 p., \$3.75. The senior author, a veteran in the production of readable textbooks in biology, is ably seconded by his junior associates. Their joint product is characterized by vivid presentation and well thought out, diagrammatic illustrations.

Science News Letter, January 22, 1938

Ethnology

THE TOLOWA AND THEIR SOUTHWEST OREGON KIN—Philip Drucker—*Univ. of California Press*, 79 p., maps, \$1. A study of a northwestern Indian group, whose culture now "exists in memory only." Desire for prestige was the outstanding interest of these Athabascan Indians, a trait that prevailed in their region.

Science News Letter, January 22, 1938

Mathematics

INTRODUCTION TO COLLEGE ALGEBRA—William L. Hart—*Heath*, 246 p., Answers, 24 p., \$1.84. This new text by the professor of mathematics at the University of Minnesota provides material for a three-hour semester course on the level of a college freshman who did not take advanced algebra in high school.

Science News Letter, January 22, 1938

Botany

A GUIDE TO THE DESERT PLANT COLLECTION, HUNTINGTON BOTANICAL GARDENS—William Hertrich—*Huntington Library, San Marino, Calif.*, 32 p., 25 c. A history of one of the better cactus collections in the West, with description of the species and lavish halftone illustrations. Obtainable direct from the Huntington Library.

Science News Letter, January 22, 1938

Agriculture

PLANT PROPAGATION AND ORCHARDING—G. W. Adriance and F. R. Brison—*Edwards*, 95 p., \$1.50. A practical horticultural text for use in Texas and adjoining states of the Southwest. Planographed.

Science News Letter, January 22, 1938

Medicine

PRINCIPLES OF ROENTGENOLOGICAL INTERPRETATION—L. R. Sante—*Edwards*, 340 p., \$5.50. A text for medical students and practitioners.

Science News Letter, January 22, 1938

•First Glances at New Books

Additional Reviews
On Page 63

Zoology

THE LONDON ZOO—E. G. Boulenger—*Dutton*, 212 p., illus., \$2. A master-writer's account of the creatures in one of the great zoological gardens of the world. With vivid descriptions and good illustrations, he introduces us to the Zoo's interesting citizens, from chimpanzees and bears to octopuses and tarantulas.

Science News Letter, January 22, 1938

Radio

THE RADIO AMATEUR'S HANDBOOK (15th ed.)—*American Radio Relay League, Inc.*, 564 p., illus., \$1, \$1.25 foreign. The book which has come to be—and rightly—the standby of the radio amateur now appears in its new edition. Every chapter has been rewritten and more than a hundred new illustrations appear. For newcomers to amateur radio the elementary principles have been reworded into an extremely lucid style, while the advanced "hams" will, as ever, find the things they want to know in other sections.

Science News Letter, January 22, 1938

Economics

THE MECHANICS OF PROSPERITY—Hobart C. Dickinson—*Williams and Wilkins*, 136 p., \$2. Economic theory by a leading automotive engineer who approaches our financial and other problems as natural phenomena.

Science News Letter, January 22, 1938

Geography

UNITS IN SOCIAL STUDIES: The Problems, Peoples and Countries of North America, South America, Our Island Possessions. Grade Five—L. S. Hance and W. W. Ankenbrand—*John C. Winston*, 126 p., 48 c.

Science News Letter, January 22, 1938

Physiology

WHY GROW OLD? A GUIDE-BOOK FOR THE MAN WHO SEEKS TO REMAIN PHYSICALLY AND MENTALLY YOUNG—Frank S. Caprio and Owsley Grant—*Maxwell Droke*, 204 p., \$2.50.

Science News Letter, January 22, 1938

Child Development

INTRODUCTION TO CHILD DEVELOPMENT AND PARENT EDUCATION—W. McKinley Menchan—*Edwards*, 321 p., \$3.35. Planned for parents and those interested professionally or otherwise in child development. The book, as the author points out, is somewhat dogmatic, but this will not lessen its value

if readers follow the author's suggestion not to take the material as "recipes," but to consider it in the light of suggestions for further thought and study.

Science News Letter, January 22, 1938

Science

THE ADVANCING FRONT OF SCIENCE—George W. Gray—*Whittlesey House*, 364 p., \$3. Interesting and reliable popularization of many fields of scientific research, extending from the heavens to the question of the length of life.

Science News Letter, January 22, 1938

Biology

STUDENT'S MANUAL IN BIOLOGY—Fredrick L. Fitzpatrick and Ralph E. Horton—*Houghton Mifflin*, 156 p., 48 c.

Science News Letter, January 22, 1938

Economics

UNEMPLOYMENT IN THE LEARNED PROFESSIONS—Walter M. Kotschnig—*Oxford Univ. Press*, 347 p., \$3.50. A penetrating international study of occupational and educational planning, of significance to those who wish the brains and knowledge of the world to be most effective.

Science News Letter, January 22, 1938

Medicine

MANUAL OF ROENTGENOLOGICAL TECHNIQUE—L. R. Sante—*Edwards*, 228 p., \$4.50. Written by the professor of radiology at St. Louis University School of Medicine, this manual should ably fulfill its author's intention of preparing a guide for radiologists who must train technical assistants and for the technicians themselves. Numerous diagrams and pictures add to the text.

Science News Letter, January 22, 1938

Medicine

MEDICAL WRITING: SOME NOTES ON ITS TECHNIC—James H. Dempster—*Bruce Publishing Co.*, St. Paul, 168 p., \$2.50. The editor of the Journal of the Michigan State Medical Society gives some valuable pointers and lessons to those about to write a medical paper or undertake the editing of a medical journal.

Science News Letter, January 22, 1938

Medicine

THE STORY OF MOTHERHOOD—Roy P. Finney—*Liveright*, 359 p., \$3. Dr. Finney uses an interesting approach to this history of childbirth and obstetrics.

Science News Letter, January 22, 1938

Geography-Aviation

OVER THE NORTH POLE—George Baidukov, Jessica Smith, tr.—*Harcourt, Brace*, 99 p., illus., \$1.50. A fascinating account of an adventurous transpolar flight, written by one of the three Soviet aviators who flew from Moscow to the United States.

Science News Letter, January 22, 1938

Gardening

GARDENING INDOORS: THE ENJOYMENT OF LIVING FLOWERS AND PLANTS THE YEAR ROUND, AND NEW OPPORTUNITIES FOR HOME DECORATION—F. F. Rockwell and Esther C. Grayson—*Macmillan*, 201 p., illus., \$2.50. The care and watering of house plants, worked out with both botanical knowledge and esthetic appreciation. The directions are practical and workable under average household conditions, and the suggestions regarding possible species and varieties should enlarge the average home's array of indoor flowers to the admiration and envy of all the neighbors.

Science News Letter, January 22, 1938

Astronomy

ANNALS OF THE ASTRONOMICAL OBSERVATORY OF HARVARD COLLEGE. Vol. 105: TERCENTENARY PAPERS—Harlow Shapley, Director—*Harvard Observatory*, 632 p., illus. Collected reprints of the astronomical papers presented at the 300th anniversary celebration of Harvard University, September, 1936.

Science News Letter, January 22, 1938

Chemistry

GENERAL AND INORGANIC CHEMISTRY (5th ed.)—Frederick C. Irwin and G. Ray Sherwood—*Edwards*, 626 p., \$1.85. A lithoprinted text in general chemistry as used at Wayne University. The emphasis, state the authors, is on the utility of chemistry for a general group of students, few of whom, perhaps, will ultimately be chemistry majors.

Science News Letter, January 22, 1938

Chemistry

LABORATORY MANUAL IN CHEMISTRY—Ralph E. Horton—*Heath*, 99 p., \$1. High school chemical experiments to accompany the text, *Modern Everyday Chemistry*.

Science News Letter, January 22, 1938

Materials—Testing

A. S. T. M. STANDARDS ON RUBBER PRODUCTS—*American Society for Testing Materials*, 238 p., \$1.25.

Science News Letter, January 22, 1938